In search of living things

59p

RECOMMENDED PRONUNCIATIONS

The children will need help in the pronunciation of the following words. Where the meaning is not explained in the text, additional examples and illustration will be necessary.

Word	*Pronunciation*	*Word*	*Pronunciation*
comet	/'komit/	introduced	/intrə'djuːst/
binoculars	/bi'nokjuləz/	separate (*adj.*)	/'sepərət/
museum	/mjuː'ziəm/	injection	/in'dʒekʃən/
nestling	/'nesliŋ/	rhinoceros	/rai'nosərəs/
species	/'spiːʃiːz/	reptile	/'reptail/
social	/'souʃəl/	gecko	/'gekou/
caterpillar	/'katəpilə/	tortoise	/'toːtəs/
parachute	/'parəʃuːt/	pyrethrum	/pai'riːθrəm/
centipede	/'sentipiːd/	mantis (*S*)	/'mantis/
recognize	/'rekəgnaiz/	mantises (*P*)	/'mantisiz/
chameleon	/kə'miːljən/	mantes (*P*)	/'mantiːz/
citrus	/'sitrəs/	leopard	/'lepəd/
pupa	/'pjuːpə/	camouflage	/'kamuflaːʒ/
termite	/'təːmait/	appetite	/'apitait/
destructive	/dis'trʌktiv/	antenna (*S*)	/an'tenə/
enormously	/i'noːməsli/	antennae (*P*)	/an'teniː/
		domestic	/də'mestik/

PREFACE

Although *In Search of Living Things* contains a certain amount of information, it seeks to do more than inform. East Africa is peculiarly rich in its wild life, and it is important that the children of this country should be made aware of the wealth of their natural heritage.

How can interest and inquiry be stimulated? Part of the answer lies in the way material is presented to children. In this book a natural conversational approach has been adopted to allow for the use of affirmative statements, negative statements and questions. If children are without this degree of language ability or are not helped to develop it, then discussion and inquiry become impossible.

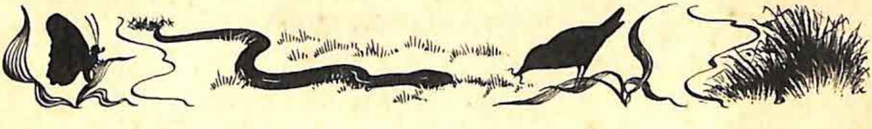
The matter of vocabulary has also to be considered. Every 'subject' has its own special list of words. Learning these words will involve understanding them, spelling them correctly, pronouncing them accurately and using them freely and confidently.

Another feature is the introduction of a family group. The senior member, Uncle Jim, would have made a good teacher. Although he teaches when necessary, he prefers to let Tom and Mary learn for themselves. In this way he encourages initiative, independence, and observation.

There are also four sets of questions, each divided into three sections. The questions vary as to content and purpose. Some test accuracy of reading; others suggest follow-up projects for individuals or groups; others again encourage further and wider observation.

Acknowledgments. This book is the result of the combined efforts of a number of individuals and their contributions are gratefully acknowledged. Also, the advice of the authorities of the Coryndon Museum in Nairobi has been frequently sought and has always been given promptly, willingly, and in generous measure.

Illustrated by RITA PARSONS

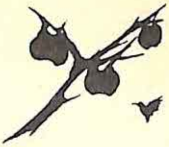


SPECIAL CENTRE · MINISTRY OF EDUCATION · NAIROBI

594
8428
Deputy Director of Public Instruction
(Planning), West Bengal.

IN SEARCH OF LIVING THINGS

CONTENTS



Page

Weaver-Birds 1

Spiders 9

Ants 19

Caterpillars and Butterflies 25

Snakes 36

Lizards 45

Praying Mantises 54

© Crown Copyright 1965

Printed & Bound in Great Britain by
Bookprint Limited, Kingswood & Crawley

LONDON / **OXFORD UNIVERSITY PRESS** / NAIROBI

[illegible]
[illegible] 26.8.05
11852

WEAVER-BIRDS

Mary and Tom were standing near the hedge at the bottom of their garden. They were watching a Comet coming in to land. Suddenly Tom said, 'Do you see that thorn-tree on the hill up there—just under where the Comet is now? There are a lot of yellow birds flying around the lower branches. I wonder if they're nesting, Mary.'

'Let's walk over there and see,' answered Mary. So they went through the garden gate and started climbing the low hill towards the thorn-tree. As they went, they saw some of the yellow birds flying to and from the tree. Many of the birds were carrying long blades of grass in their beaks. 'Yes, they *are* building their nests, Tom,' said Mary. 'Don't let's go any nearer. We don't want to frighten them away. I know what we'll do. Let's go back home and ask Uncle Jim to lend us his binoculars. Then we can stay in our own garden and watch the birds from there.'

'That's a good idea, Mary!' said Tom. 'We'll see exactly what they're like and what they're doing and then we can ask Uncle Jim about them. He knows a lot about birds and animals and insects. Perhaps he'll come out and watch the birds with us.'

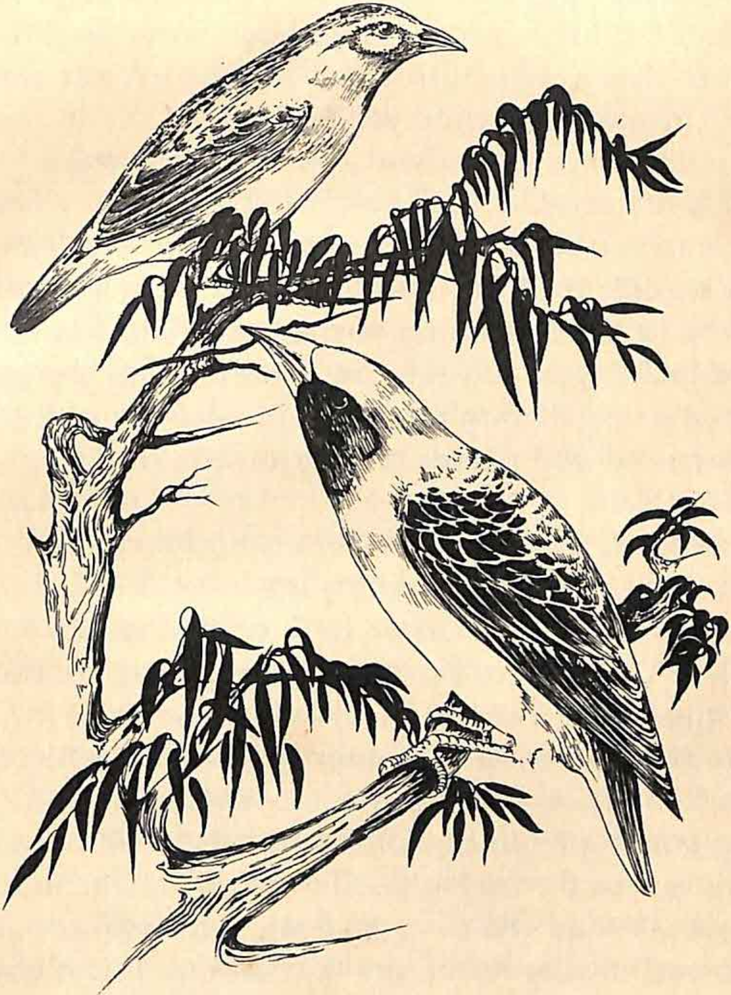
Uncle Jim was busy writing letters when the children walked in. 'All right, children,' he said, 'I'll lend you my binoculars if you promise to take care of them. I can't come out with you just yet. You two go and watch the birds carefully and I'll come when I've finished writing.'

'Thank you, Uncle Jim!' said the children as they left the house. When they reached the garden fence, Tom took the heavy binoculars out of the leather case. He and Mary took turns in using the glasses and for half an hour they carefully watched the birds. When Uncle Jim came out to them, they had many things to tell him and many questions to ask.

'Tell me what you've seen, children,' he said. 'You first, Mary.'

'Well, Uncle,' answered Mary, 'there seem to be two different kinds of birds. One is yellow or greenish-yellow with a black patch on its face. The patch makes it look as if it's wearing a black mask. The other birds are not brightly coloured at all. They're a sort of greyish-green. But the two kinds seem to be working together to build nests.'

'Well done, Mary!' said Uncle Jim. 'Although they are both really the same kind of birds they *do* look quite different.' He looked through the glasses. 'Yes, those are all weaver-birds. They're Speke's Weavers, to be exact. But the brightly coloured one is the male and the other is the female. It often happens with birds that the male and female look quite



Speke's Weavers

different. Usually it's the male that is more brightly coloured. So all the birds you've been watching in that thorn-tree are weaver-birds. Now, Tom! What was the most interesting thing *you* noticed?'

'I noticed something about the way they were building the nest, Uncle. The cocks seemed to work mostly on the outside of the nest and the hens inside.'

'That's quite true, too,' said Uncle Jim. 'The females usually build the soft lining of the nest. And sometimes, if you're lucky, you can see the male passing the end of a blade of grass through to the female. Then she twists it round and passes it back to him again. Isn't that clever!'

'We didn't see that, Uncle Jim,' said Mary. 'But perhaps we'll be lucky another day.'

'Let's go and have a closer look at the nests, shall we?' asked Uncle Jim. 'If we walk up quietly we shan't disturb the birds. They're much too busy.'

As the three of them got nearer to the thorn-tree, they could hear an unusually loud twittering and chirping coming from one of the half-finished nests. The female was fluttering busily round on the outside, but Uncle Jim and the two children were still too far away to see exactly what she was doing. 'Is it a cat or a snake or something that's frightening her, Uncle?' asked Tom.

'No, I don't think so, Tom,' replied Uncle Jim. 'Let's get a bit nearer and then you'll be able to see. Watch her carefully.'

When they were a little nearer, Mary suddenly whispered, 'What on earth is she doing, Uncle? It looks as if she is pulling the nest to pieces.'

'That's exactly what she is doing,' said Uncle Jim. 'She doesn't think it's safe. She isn't satisfied with it. Perhaps she's telling Mr Weaver that he isn't a very clever builder. But don't worry. They'll have finished the nest properly by tomorrow. And if you watch the tree for the next few days you may see Mr Weaver making a few more nests even though they won't be used.'

'I've seen a weaver-bird's nest in the museum,' said Tom. 'It was beautifully made—like a long purse made of grass. But it's much more interesting to watch the birds making it.'

'When the young birds have flown away,' said Uncle Jim, 'we must examine one of the nests very carefully to see how it is hung on the branch and where the eggs are laid and how the parents get in and out.'

'Yes, we'd like that,' said Mary. 'We'd like to watch the young ones learning to fly, too.'

'What colour are the eggs, Uncle?' asked Tom.

'They're a fairly light blue, Tom,' Uncle Jim said. 'One day I'll help you to have a look at them without disturbing the birds. We'll need a step-ladder. Now, you two! Do you think I've told you enough to help you to start writing your bird-watching diary?'

'Yes, thank you, Uncle,' said the two children. 'We'll try to write carefully in our new note-books.'

This is how their notes began:

Saturday, September 9th.

Two Speke's Weavers have started building their nest in the thorn-tree.

Monday, September 11th.

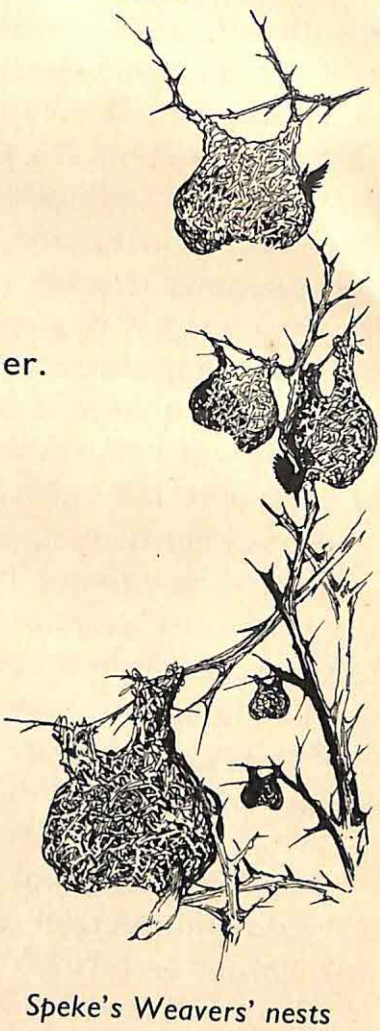
Eight more weavers have settled in the same tree. They seem to like living together. The proper name for a lot of birds living together like this is a 'colony'.

Sunday, September 17th.

We saw three eggs in the first nest. They were light blue.

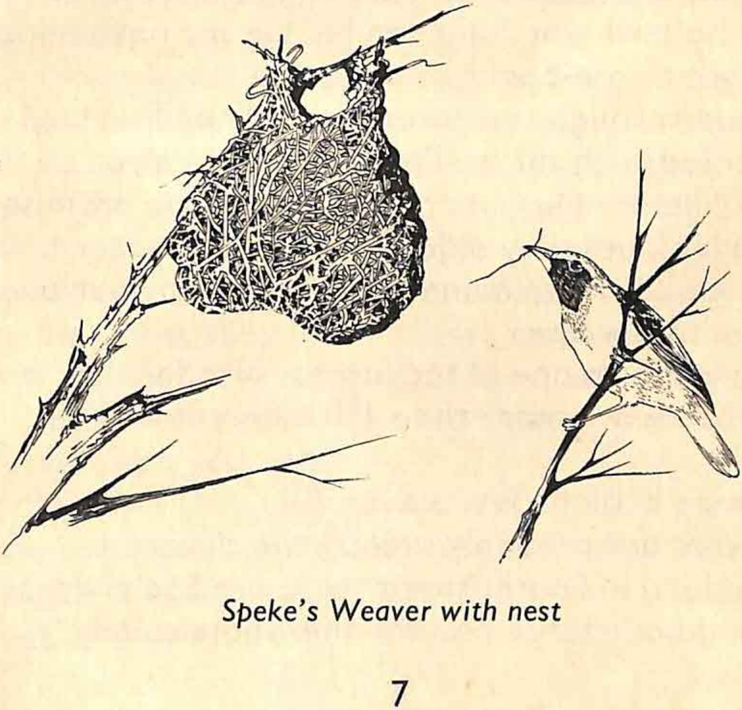
Monday, September 18th.

We have seen Mr Weaver building three other nests during the week-end. One of them he pulled to pieces himself. The other pairs of weavers are all nest-building.



Speke's Weavers' nests

Whenever they had any spare time, Tom and Mary kept on watching the colony of weaver-birds. Mrs Weaver was very busy feeding three hungry nestlings with insects and seeds. Sometimes Mr Weaver would help, but sometimes he kept on building nests on his own. When the young birds were about a month old they were ready to fly away. And one morning Tom and Mary noticed, rather sadly, that the nest was empty. The young birds had all gone. They ran to talk to Uncle Jim.



Speke's Weaver with nest

'Would it be unkind to take the old nest to school for our Nature Table?' asked Tom.

'Not at all,' answered Uncle Jim. 'Mary can take one too. You see, although weavers often come back to the same tree, year after year, they don't use the old nests again. They always make new ones. So you'll be able to watch them again next year, if you want to.'

'I think I'd rather watch some different birds next time,' said Mary.

'Well, I think you've made a good start, children,' said Uncle Jim. 'You've been very patient and you've taken a lot of trouble. I'm glad you've discovered how interesting bird-watching can be. Let me have another look at your note-books.'

He read through the notes carefully and seemed very pleased with them. 'I'm going to take you to the Natural History Museum one day soon,' he promised. 'We can look at many different kinds of weaver-birds there. Now I'll write a line or two more in your books.'

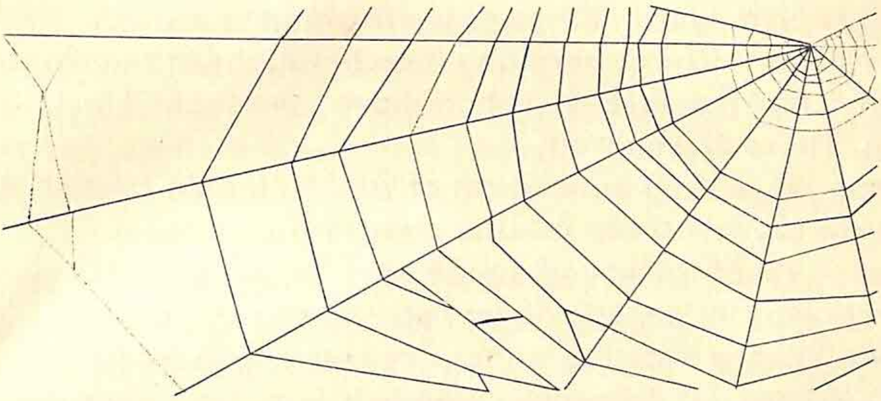
In Tom's he wrote:

'Weavers form one of the largest bird families in Africa. There are more than 250 different species (kinds).'

In Mary's book he wrote:

'Weavers are probably among the cleverest nest-builders. In South Africa there are Social Weavers which build one large nest for the whole colony.'

SPIDERS



Mary: Will you tell us about spiders today, please, Uncle Jim?

Tom: Yes, please, Uncle! We found a big web in the garden this morning, but we didn't see the spider.

Uncle Jim: What kind of web was it, children?

Mary: Oh, just an ordinary one, about as big as my hand when I stretch my fingers.

Tom: Aren't all spiders' webs the same, Uncle?

Uncle Jim: No, they aren't, Tom. Different kinds of spiders make different kinds of webs. Some spiders don't make webs at all. Tell me what you remember about the web you saw.

Tom: I didn't look very carefully, Uncle. But there was a little bag near the middle and the threads around the bag were finer and neater than those on the outside of the web.

Uncle Jim: You said you didn't see the spider?

Mary: No, Uncle. Perhaps we frightened it away.

Uncle Jim: Were there any insects caught in the web?

Mary: No, I'm sure we should have seen them, Uncle Jim. There weren't any.

Uncle Jim: Well done, both of you! You didn't miss much. Now you can ask me questions.

Tom: What is the web made of?

Uncle Jim: It's made of very strong silk thread.

Tom: Where does the spider get the thread from?

Uncle Jim: Underneath its body it has about six tubes. When the spider needs the silk for spinning the web, it squeezes the silk out through these tubes. It's rather like squeezing a tube of tooth-paste. The silk soon hardens in the air and becomes a strong thread. And the spider can make the thread thicker or thinner, as you saw.

Mary: What was the tiny bag for, Uncle?

Uncle Jim: That was for the eggs. It was made of very fine silk, wasn't it? Much finer than the web itself.

Tom: Yes it was, Uncle. We'll go and have another look at it soon. But now tell us about different kinds of spiders.

Uncle Jim: Just a minute! There are hundreds and hundreds of different kinds all over the world. I'll tell you about some of the most interesting ones. But there are some more things we ought to talk about first.

What does the spider use its web for?

Tom: For catching other insects so that it can eat them.

Uncle Jim: Anything else?

Mary: For keeping its eggs safe near the middle in that silk nest that we saw.

Uncle Jim: Good! What happens when a spider catches a fly or a beetle in its web?

Mary: I'm not quite sure. I suppose it eats it all up.

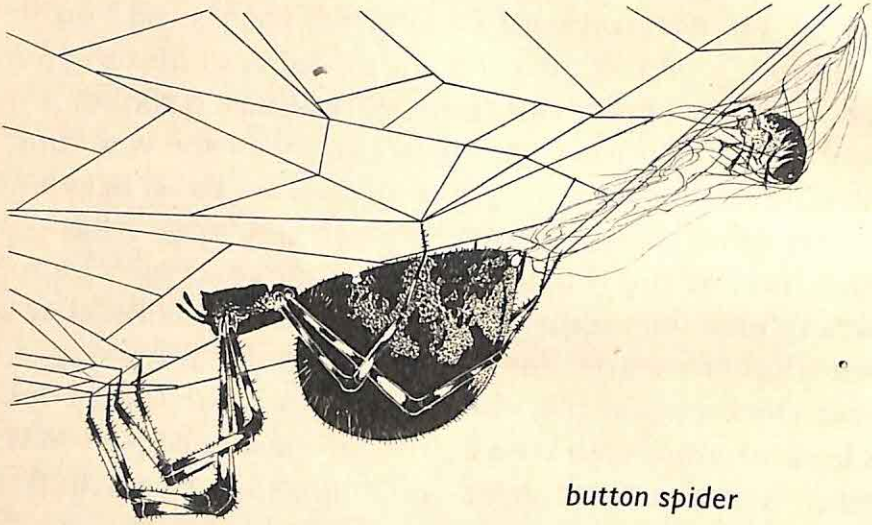
Uncle Jim: Well, that's not quite right, so I'll tell you about it. The spider has fangs rather like a snake. It waits until the insect has been caught in the web and has stopped struggling. Then it goes up to its prey and squirts some poison into it through the fangs. The result is that the insect can hardly move at all. Then the spider winds some silk thread round the insect so that it can't escape. And when the spider is hungry, it sucks the blood of the insect. Perhaps when we go out to look at your web we shall see an insect caught in it.

Mary: No wonder people don't like spiders much. Are there many poisonous spiders, Uncle Jim?

Uncle Jim: All spiders have poisonous glands, but only a few are dangerous to human beings. In East Africa the button spider is the only one that is really dangerous, though there are others that can give you an unpleasant bite. But on the whole spiders are very useful, you know. They catch many harmful insects.

Tom: Tell us about button spiders, Uncle Jim.

Uncle Jim: They usually make their webs in cracks on the ground. They like to eat beetles. When a button spider sees a beetle in the web, it goes up to it and turns round and squirts liquid silk all over the beetle. When the silk hardens, the beetle can't move. And that's the end of the beetle.



button spider

Mary: I know spiders are clever, but I still think they're cruel.

Uncle Jim: They certainly aren't pleasant to look at. If you look at a spider's head through a magnifying glass you'll see what I mean. They have eight eyes in two rows. They use these to look for their prey. They also have two squeezers to hold their prey and the two fangs I told you about to poison it with. But they're not any more cruel than many animals or birds or insects that feed on other living creatures, although . . .

Mary: Although what, Uncle Jim?

Uncle Jim: Although I sometimes feel sorry for Mr Spider.

Mary: Why? What happens to him?

Uncle Jim: Well, sometimes, Mrs Spider thinks she doesn't need him any more. So she simply ties him up and . . .

Mary: You *don't* mean she eats him, Uncle! Does she eat the baby spiders as well?

Uncle Jim: No, she looks after them very well.

Tom: When the eggs hatch out, what are the young ones like, Uncle? Do they look like grubs or caterpillars?

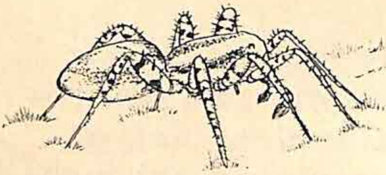
Uncle Jim: No, they are tiny spiders like their parents.

Tom: Do they stay with their mother?

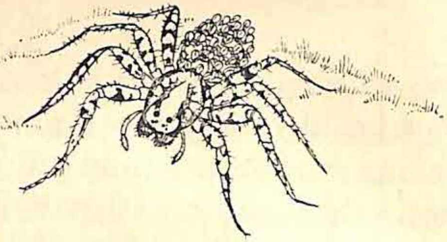
Uncle Jim: Only for a very short time. They very soon leave the soft nest of silk. If the web is high up they usually leave by parachute.

Tom: Not a real parachute, Uncle.

Uncle Jim: No. At the right time, the wind carries them gently away. Each of them is hanging at the end of a long thread of silk. As soon as they land they start looking after themselves.



wolf spider (male)



wolf spider (female)

Mary: Uncle Jim! You told us that some kinds of spiders don't make webs. How do they catch their food?

Uncle Jim: Well, there's the wolf spider, for example. It catches insects by leaping on them. That's how it gets its name.

Tom: If wolf spiders don't have webs or nests, where do they leave their eggs?

Uncle Jim: That's a good question, Tom. They don't leave them anywhere. They carry the bag of eggs around with them all the time.

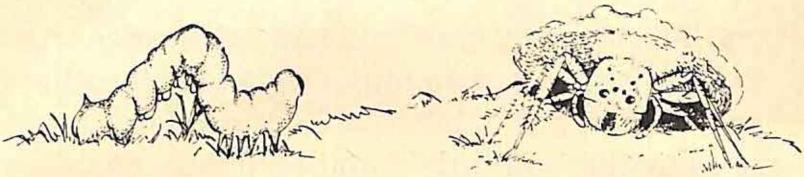
Tom: What about the baby spiders when the eggs have hatched out, Uncle?

Uncle Jim: They're carried round on their mother's back.

Mary: All the time, Uncle?

Uncle Jim: Yes, Mary. And if she gets killed in a fight with another wolf spider, the baby spiders climb on to their new mother's back.

Tom: What were the other interesting spiders you promised to tell us about?



trap-door spider

Uncle Jim: The trap-door spider is one of them. It lives in a small hole in the ground. It covers the entrance with a round door, like the lid of a tin, which it can open and close easily. The spider opens the door just wide enough to see what is passing by. Then when a beetle or a caterpillar or something good to eat comes close enough, out jumps the spider. It quickly pulls its prey into the hole and shuts the door.

Tom: I'd like to see one of those.

Uncle Jim: I don't think we have time to talk much longer. It must be nearly lunch-time. Aren't you hungry?

Tom: *I* am, Uncle. Let's go and eat.

Mary: Just one more, please, Uncle Jim.

Uncle Jim: Well, I can't remember their special name, but in some parts of the world there are very big spiders that build very large webs. The webs are so strong that men use them as fishing nets. They don't break even if they are used to catch quite large fish.

Tom: That's wonderful, Uncle, if it's true. You aren't teasing us, are you?

Uncle Jim: No, I'm not making it up. It's really true.

Tom: But how do the men make the webs into nets?

Uncle Jim: They bend a piece of bamboo into a loop. Then they put the bamboo frame near a spider's web. When it has finished its web there's the fishing net. Of course the thread in those webs is much thicker than the thread you saw this morning. Now let's go and have something to eat. This afternoon we'll go and look at the web you found and try to find some more.

I

A. Questions

Read the sections on 'Weaver-Birds' and 'Spiders' carefully and answer these questions:

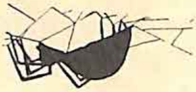
1. What kind of tree did the birds build in?
2. What colour were the male birds?
3. What do we use binoculars for?
4. What is the name for a number of birds living and nesting together?
5. About how old were the young birds when they flew away from the nest?
6. Do all spiders make webs?
7. Does a spider eat up the whole of an insect caught in its web?
8. Why are spiders useful?

9. How do young spiders get away from a web that is built high up?
10. Does a spider change into a grub at any time during its life?

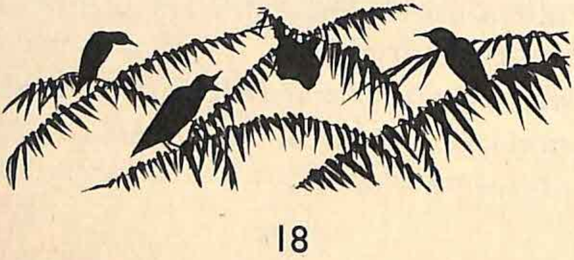
B. Things you can try to do

1. Find any disused bird's nest. Describe it carefully—its shape, size, colour and the materials used. If you can, say what kind of bird built it.
2. Make three lists of birds:
   (a) Those which are mainly seed- or grain-eaters.
   (b) Those which are mainly insect-eaters.
   (c) Those which are mainly flesh-eaters.
3. Find a spider's web and draw the pattern.
4. Find two different kinds of spider. Write notes on how they are alike and how they differ.
5. Ask your teacher to let you help to make a bird-table in the school garden.
6. Make collections of feathers. Try to find out what birds they came from.
7. Swallows come all the way from the British Isles to Kenya and even as far as South Africa. What sea do they have to cross?

C. General Questions



1. Name three different kinds of birds you have seen in a town *or* five different kinds you have seen living away from a town.
2. Can you give a reason for the difference in shape between a hawk's (or kite's) beak and a duck's bill?
3. Find out why a bird doesn't fall off its perch when it is asleep.
4. Can you think of three differences between birds and reptiles?
5. How does the butcher-bird get its name?
6. How many legs has a spider?
7. Find out why a spider does not stick to its own web.
8. A grasshopper can jump. Can it also fly?
9. Why should you keep house-flies away from food?
10. What does a centipede look like and what does the word 'centipede' mean?



ANTS

Tom: Uncle Jim! You promised to talk to us about ants today. Tell us all about them, please.

Uncle Jim: *All* about them! That would take a very long time. There are between three and four thousand different kinds of ants in the world. But I'll tell you some of the interesting things they do, if you like. To begin with, most kinds live together in very large numbers. We call the place where they live an ants' nest. Some build nests underground and some above the ground. But there are some that don't build nests at all.

Mary: I think they're very clever insects, don't you, Uncle?

Uncle Jim: Well, I'm not quite sure that 'clever' is the right word to use about insects or birds or even animals. But ants certainly seem to be able to work together and to do some things which remind us of things that human beings do.

soldier ant

Tom: What do you mean, Uncle?

Uncle Jim: Well, some ants have nurseries and nurses to look after the baby ants. Some keep herds of cows—

Mary: You're teasing us, Uncle Jim. Ants can't keep cows.

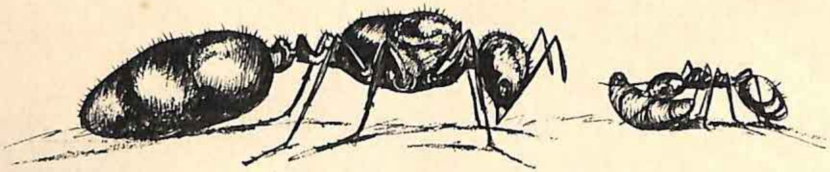
Uncle Jim: Well, they're rather special cows, Mary. I'll tell you about them later. Then there are ants that are gardeners—they make vegetable gardens in their nests. And of course there are plenty of soldier-ants—but they're all *female* soldiers. There are even slaves—ants that are captured and work for their masters.

Tom: It all sounds impossible, Uncle. I shouldn't have thought insects could do any of those things. Tell us about the ants that we've found in our garden.

Uncle Jim: Right! You tell me what you've seen so far.

Tom: Our ants seem to be building underground. There are small heaps of earth lying about near the place where the ants are going in and out.

Mary: I suppose they're bringing the earth up from



queen and worker-ant

down below inside the nest they're building.

Uncle Jim: Yes, that's right, Mary. They're making underground passages and small caves for their eggs and grubs. Later on the grubs will change into full-sized ants.

Right in the middle of the nest lives the queen ant. She lays all the eggs. Some of the worker-ants feed her. All worker-ants are female. Some of them go out of the nest to hunt for food, some work to make the nest bigger, some act as soldiers and some as nurses.

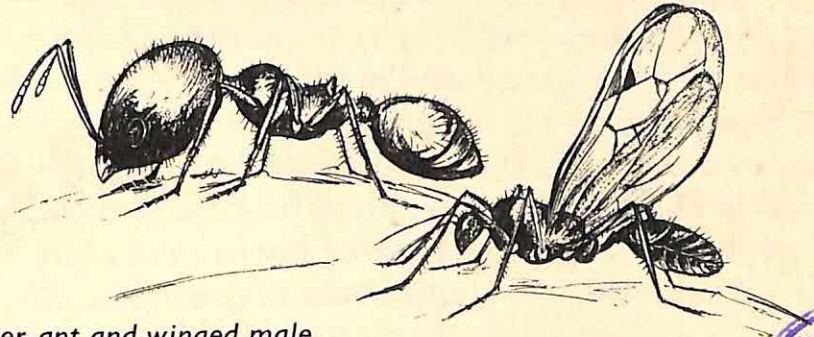
Mary: How do the nurses look after the grubs, Uncle?

Uncle Jim: They feed them and they wash them and they carry them about.

Tom: What do they wash them with?

Uncle Jim: Well, the nurses have a special kind of tongue and they lick the grubs to keep them clean. Like a mother-cat licking its kittens.

Mary: Why do they carry the grubs about?



soldier-ant and winged male

Library
26.8.05

Uncle Jim: The grubs mustn't be too hot or too cold. In the day-time, when it's very hot, the nurse-ants carry the grubs lower down in the nest where it's cooler. At night they bring them up again into the warmer places near the top of the nest.

Tom: How can you tell a soldier-ant from the others, Uncle Jim?

Uncle Jim: Usually they're bigger, sometimes very much bigger. And they have large heads and strong jaws to fight with. They keep away ants from other nests.

Mary: How does a soldier-ant know if an ant comes from another nest?

Uncle Jim: Each ant carries the particular smell of its own nest and the soldier-ants recognize strangers by that.

Tom: What about the cows that some ants keep, Uncle?

Mary: Yes, you said they were special cows.

Uncle Jim: So they are. They're greenflies. Their common name is plant-lice. I'm sure you've seen one kind of greenfly on rose-bushes. Now some ants have discovered that they can get a sweet juice from greenflies by stroking them. You know most ants are fond of sweet things like sugar or honey, don't you?

Mary: But do they really keep these greenflies like cows?

Uncle Jim: Yes, they do. The ants look after the greenflies just as a farmer looks after his cows. In the summer they take the greenflies up to feed on the fresh sweet plant-juices. In the winter the ants take them down into the nest. And they have to feed their cows during the winter.

Mary: Uncle Jim, you're forgetting again! We don't have summer and winter in East Africa.

Uncle Jim: You're quite right, Mary. I was thinking about some ants in England.

Tom: I wish I could see all that, Uncle Jim. It sounds like a fairy-story. But it *is* true, isn't it?

Uncle Jim: Yes, I'm not teasing you—some ants really do that. And there's another kind called the honey-ant. They have living honey-pots.

Mary: What do you mean, Uncle?

Uncle Jim: Well, some of the workers eat all the honey that is brought into the nest. They're so full of honey they simply can't move. If one of the other workers is hungry it just goes to one of these 'honey-pots' and strokes it. Then the honey-pot ant lets it have some honey.

Mary: If there are so many different kinds of ants—how many did you say?—three or four hundred?—we could spend our whole lives learning about them.

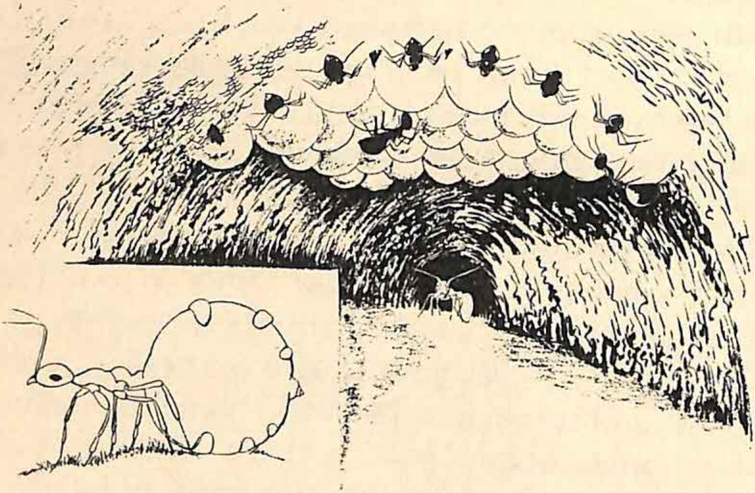
Uncle Jim: I said three or four *thousand*, Mary, but we're not going to learn about every single kind.

We've done enough talking already for one day. Let's go out into the garden and use our eyes instead of our tongues. We'll look at the ants' nest you've found and see if we can learn something about that kind to begin with, shall we?

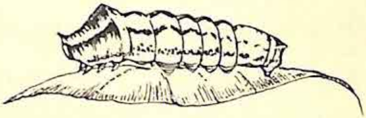
Tom: Isn't it tea-time yet? I'm ever so hungry.

Mary: So am I. Aren't you, Uncle?

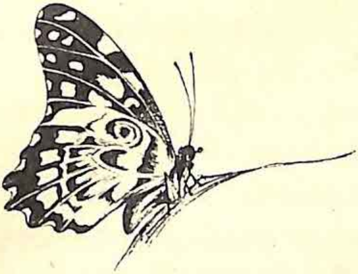
Uncle Jim: Yes, I think I am. But tea won't be ready for another half hour so we've got time to look at the ants first.



North American honey-pot ant



CATERPILLARS AND BUTTERFLIES



'Uncle Jim! Uncle Jim!' shouted Tom. 'Come and look at these lovely green caterpillars we've found.' Mary and Tom were in the garden near a lemon tree. They were looking closely at a small group of caterpillars clinging to the leaves. Uncle Jim was always pleased with the two children when they showed they were interested in Nature-Study. He was sitting on a chair reading his paper and smoking his pipe, but he jumped up and walked quickly towards the lemon tree.

'There they are, Uncle!' said Tom. 'There are nine of them—I've counted. We thought we saw a chameleon and we looked carefully and found these.'

'Yes, I think I know what kind these are,' said Uncle Jim, looking at them thoughtfully.

'Tell us please, Uncle,' said Mary. 'We want to know all about them.'

'All right!' said Uncle Jim. 'I'll tell you what we'll do. We'll watch them change into butterflies. You can find out for yourselves what happens and that will be better than my telling you.'

'What do we have to do?' asked Tom.

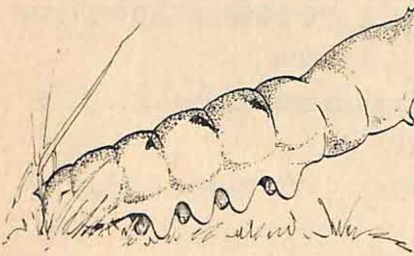
'Go and ask your mother for a large tin, a piece of fine cloth like mosquito net and a piece of string or a rubber band,' said Uncle Jim. 'When you've got those, come back and tell me. I'm going to finish reading the paper.'

The children ran to their mother, who was busy in the kitchen. 'What do you want a tin for this time, children?' she asked. 'Last time it was tadpoles and you spilt some water down the side of the cupboard.'

'It's big green caterpillars, Mother,' said Mary. 'Uncle Jim says we can watch them turn into butterflies.'

'Very well,' said their mother. 'But you're not going to keep them in the house—nasty smelly things!'

'We'll keep them on the shelf on the verandah,



citrus swallow-tail caterpillar

Mother,' said Tom. 'That'll be all right, won't it? I don't think they'll smell. They'll get plenty of air through the cloth.'

'Well, don't forget to feed them properly,' said Mother. 'It's cruel to collect things and then forget all about them and let them die.'

'No, we won't, Mother,' said Mary. 'We're going to look at them every day, and keep a diary about them. You know we kept a diary about the weaver-birds.'

'Here you are then,' said Mother. 'Here's the tin and here's a bit of mosquito net and you'll find a rubber band in that drawer. Now I want to get on with my work.'

'Thank you, Mother,' said Mary. 'Come on, Tom. Let's drag Uncle Jim back to the lemon tree.'

'What do we do now, Uncle?' Tom said as the three of them stood round the tree.

'Break this twig off—the one where the caterpillars are—and put it in your tin. Caterpillars don't like warm damp hands very much. Then take the tin to a shady place and leave it there. Don't forget to fix the net on top of the tin and don't keep moving the tin around.'

'We thought of putting it on the shelf on the verandah,' said Tom. 'Do you think that will be a good place?'

'Yes, that will be quite all right, Tom,' said Uncle

Jim. 'You'll be able to watch your caterpillars even when it's raining.'

'Don't they eat a lot! Some of these leaves are almost eaten away!' exclaimed Mary, who was still examining the leaves of the lemon tree. 'Will they eat any kind of leaf or does it have to be this special kind?'

'It's always better to give them the kinds of leaves you've seen them eating, Mary,' replied Uncle Jim. 'Caterpillars like these eat leaves from lemon trees or orange trees or grapefruit trees—the kinds we call citrus trees. But give them some fresh leaves from *this* tree every day or two. It wouldn't do to give them leaves from blue gum trees, would it? I forgot to tell you that these particular caterpillars will turn into citrus swallow-tail butterflies.'

'Does that mean their hind-wings are forked like a swallow's tail, Uncle?' asked Tom.

'No, it doesn't—not in this particular kind.'

'We haven't asked you the most important question of all,' said Mary. 'What colour will they be?'

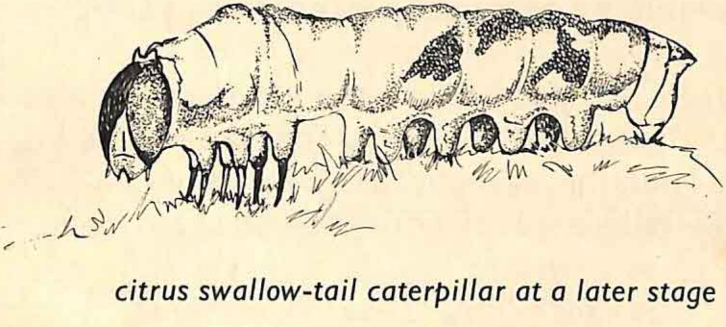
'Now *that* I'm not going to tell you,' said Uncle Jim. 'If I leave it to you to find out, it'll be more exciting for you. But I *will* tell you that they're beautiful butterflies. If you bring me my book on African butterflies I'll read to you about them. But you mustn't look at the book until you've finished your diary by yourselves.'

Tom went and got the butterfly-book. Uncle Jim found the right place and began to read:

'The citrus swallow-tail can be found nearly everywhere in Africa south of the Sahara Desert. It commonly lives in warm wet districts where trees such as the orange, lime, lemon and grapefruit grow well. The leaves of citrus trees form the main food-supply of the caterpillars. The butterfly lays white eggs on the underside of the leaves. These eggs turn yellow, and just before hatching they turn black. The young caterpillars are brown with spots of grey and white, but later the colour changes to a beautiful green.'

'That's like our caterpillars,' interrupted Mary. 'They must be quite old, then.'

'Yes, I expect they've burst their skins and grown new ones two or three times already,' said Uncle Jim.



citrus swallow-tail caterpillar at a later stage

'Most caterpillars do that, you know.'

'What happens next?' asked Tom.

'That's for you to find out, children,' replied Uncle Jim. 'I've helped you enough now.'

So the children watched the caterpillars carefully for several days. As the days went on, the caterpillars ate less and less and one day something very exciting happened. Mary looked carefully, as she always did, to see that the caterpillars were still there, but she could not see more than six. To make sure that she had not made a mistake she called Tom to come and look. Tom counted carefully, but he could not see more than six either. 'They can't have got out through the net,' he said. 'We'd better go and ask Uncle Jim what's happened. There aren't any dead ones anywhere.'

Uncle Jim was walking round the garden looking at the flowers. Tom raced up to him and said, 'Come and look at our tin, Uncle. Something's happened. Three of the caterpillars have disappeared. I can't see them anywhere.'

When Uncle Jim got back to the verandah he looked into the tin and smiled. 'Can you see those three little brown bags hanging on that twig?' he asked.

'Yes,' said Mary, 'but they're only dead leaves, aren't they?'

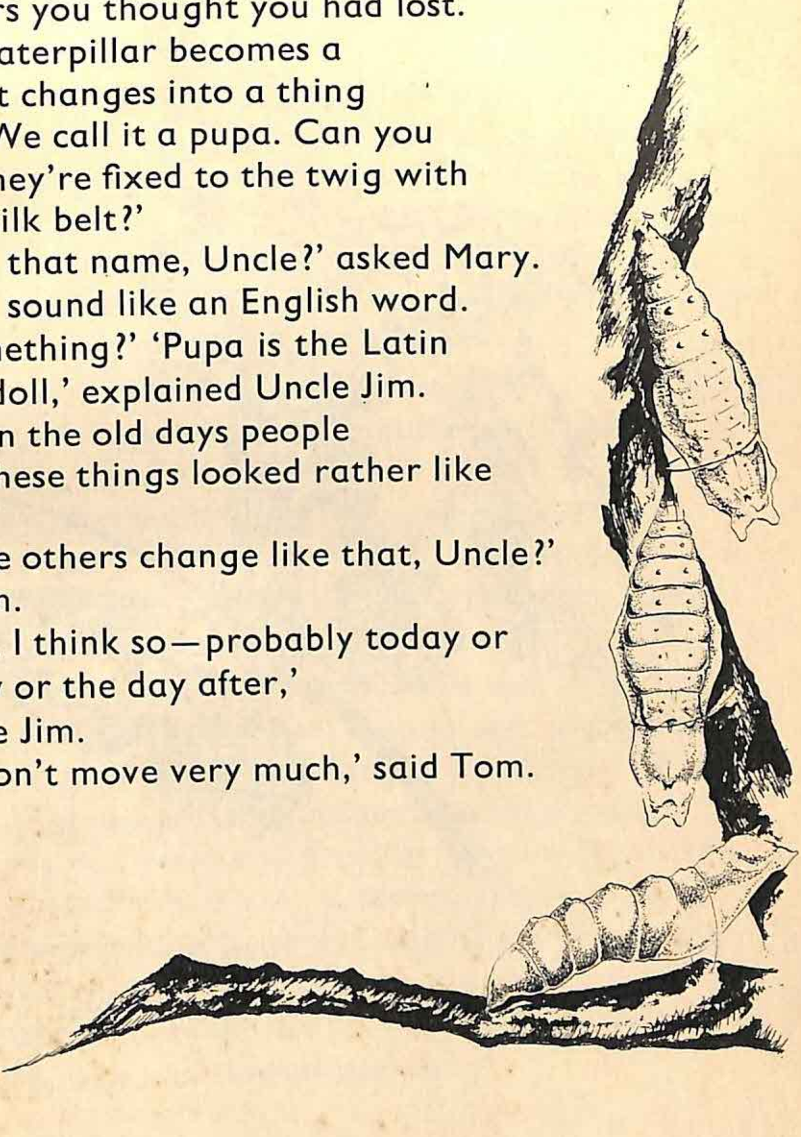
'Oh, no!' said Uncle Jim. 'They're the three caterpillars you thought you had lost. Before a caterpillar becomes a butterfly it changes into a thing like that. We call it a pupa. Can you see how they're fixed to the twig with a kind of silk belt?'

'What's that name, Uncle?' asked Mary. 'It doesn't sound like an English word. Pew—something?' 'Pupa is the Latin word for doll,' explained Uncle Jim. 'Perhaps in the old days people thought these things looked rather like rag dolls.'

'Will the others change like that, Uncle?' asked Tom.

'Oh yes, I think so—probably today or tomorrow or the day after,' said Uncle Jim.

'They don't move very much,' said Tom.



pupae

young citrus swallow-tail butterflies

'I don't think we shall enjoy watching things that don't do anything.
I don't like them as much as the caterpillars.'

'There won't be anything to see for a long time now —not for a few months,' said Uncle Jim. 'Write your diary of what you've seen so far and don't forget to say what a pupa looks like.'

'Will you tell us when you think they'll change into butterflies, Uncle?' asked Mary.

'Yes, of course I will,' said Uncle Jim.

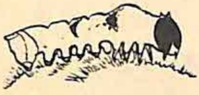
A few months later he said, 'I think you'd better start watching your tin again.'

One sunny afternoon Mary was on the verandah. She called out excitedly, 'Tom! Tom! Come here quickly!' Tom rushed out of the house and they were both able to see what they had waited for so long.

The brownish bag was moving. They saw it split and there was the first butterfly wriggling out. Very, very slowly it stretched its wings. It seemed to grow stronger and stronger. And at last they knew the answer to the question which Uncle Jim would not tell them. The butterfly was pale greenish-yellow with black markings and on its hind wings there were two spots like eyes of red and blue.

'What a beautiful butterfly it is!' exclaimed Mary. 'I *am* glad we watched it growing up.'

11



A. Questions

Read the sections on 'Ants' and 'Caterpillars and Butterflies' and answer these questions:

1. About how many different kinds of ants are there?
2. Name two of the kinds of work that worker-ants do.
3. How can you tell a soldier-ant from the others?
4. Why do the nurse-ants carry the grubs about?
5. What do you call the ant that lays the eggs?
6. Why did Tom and Mary put mosquito netting on top of the jar they kept the caterpillars in?
7. About how long did these caterpillars take to change into butterflies? Several days, several weeks or several months?
8. If you decided to keep caterpillars, how would you know what kind of leaves to feed them on?
9. Name two citrus trees.
10. Describe any butterfly you have seen. As well as giving its colour, shape and size, say when and where you saw it.

B. Things you can try to do

1. White ants, also called termites, cause much damage to wooden buildings. People try to get rid of them by killing the queen. It is difficult to find the queen because it lives underground. Look at a queen (or a picture of a queen) and compare it with a worker white ant.

2. Bring to school a piece of wood (or softboard) partly eaten away by white ants, or bring a piece of soil from a white ant's nest.
3. White ants do not like bright sunlight. Find out how they avoid it.
4. Get somebody who has seen safari ants (*siafu*) on the move to tell you about them.
5. Keep some caterpillars as Tom and Mary did. Keep a diary—noting the changes and describing them carefully.
6. Borrow a magnifying glass and see if you can find any difference between the head of a butterfly and the head of a moth.
7. Make drawings of three different kinds of caterpillars and butterflies.
8. Draw an ant (a) from the side (b) from the front (c) from the top.

C. General Questions

1. What differences have you noticed between an ant and a spider?
2. Name five winged insects.
3. When they are resting, butterflies and moths usually have their wings in a different position. Have you anything to say about this?

4. Some mosquitoes carry diseases. Find out the name of one of the diseases.
5. Where does the queen white ant live? Why do you think it lives where it does?
6. Examine a caterpillar carefully and answer these questions:
   (a) How many legs?
   (b) Are the legs all the same?
7. How many legs has a butterfly?
8. What are the chief enemies of
   (a) ants?
   (b) caterpillars?
9. On what kind of day are you most likely to see butterflies?
10. Write down some of the differences between bees and butterflies.

SNAKES

'A snake! I can see a snake!' shouted Tom at the top of his voice. He was sitting in the garden at the side of the house. Everybody rushed out—Father, Mother, Uncle Jim and Mary. But they were too late. All they could see was the tail of the snake disappearing beneath the leaves of a low-growing bush.

'It was a mamba! I'm sure it was a black mamba,' said Tom, rather frightened. 'No it wasn't, Tom,' said Uncle Jim. 'There's nothing to worry about. It was only a harmless little house-snake.' Everybody looked pleased and Uncle Jim went on, 'In fact we're lucky to have one near the house. They're very useful. They live on mice and rats.'

'I don't like snakes at all,' said Mary. 'They always make me feel frightened. I don't stop to think whether they're harmless or not.'

'Well, I'll tell you what we'll do,' said Uncle Jim. 'One day, if you're good and Father and Mother say you may go, I'll take you to the Snake Park at the Museum. Then you can see for yourselves some of the common harmless snakes and you needn't be frightened

house-snake

of them any more. Meanwhile let's go in and have our tea and you can ask me questions about snakes while we're sitting down.'

So they all went in and the two children sat down near their uncle. 'Why don't we see snakes very often?' asked Tom.

'They hear you coming and wriggle away,' said his uncle. 'Well, that's not quite right. They don't *hear* you very well, but they *feel* your footsteps shaking the ground and they disappear quickly. It isn't often that they're brave enough to stay where they are.'

'What's the thing that keeps flickering in and out of a snake's mouth?' asked Mary. 'I suppose it's the snake's tongue, but why does it keep on going in and out?'

'It *is* the snake's tongue, Mary,' answered Uncle Jim, 'but it's different from ours in several ways. First of all it's forked—the end is split in two. Secondly it can come out of the snake's mouth through an opening in the front of the upper jaw even when the snake's mouth is shut. And the snake doesn't use its tongue for tasting or lapping up water as animals do. So far as we know, the snake's tongue helps it to smell, not to taste. And I think a snake drinks by putting its mouth in the water and gulping or sucking. I've never seen one drinking myself, but that's what I've been told.'

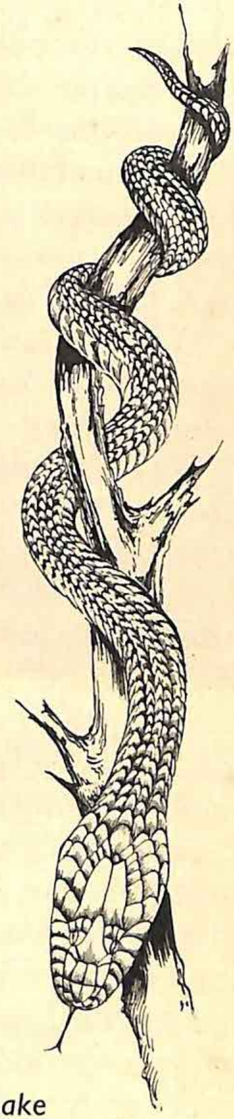
'Fancy smelling things with your tongue!' laughed Mary. 'I know we can feel things with our tongues. We can tell whether they're hard or soft or rough or smooth. But I can't imagine smelling things with my tongue.'

'I once saw a picture of a snake swallowing a rabbit whole,' said Tom. 'I don't understand how it can do that. I've got a bigger mouth than a snake and I couldn't do it if I tried.'

'No, you'd break your jaw,' said Uncle Jim. 'But the snake's jaws aren't joined together like yours, so its mouth can stretch enormously.'

'But how does the snake breathe when its mouth is so full?' asked Mary. 'It can't breathe through its nose.'

'That's a good question,' said Uncle Jim, 'but the answer is a long one and perhaps a bit difficult to explain.



brown house-snake

All I'll tell you now is that the snake *is* still able to breathe through its mouth.'

'Can snakes make any other noise besides hissing?' asked Tom.

'Not usually,' answered Uncle Jim. 'But there *are* some snakes which are called rattle-snakes because they can make a rattling noise with their tails.'

'Oh yes, I forgot,' said Tom.

'You told us a long time ago that snakes have no eyelids and no ear-holes, Uncle. What about teeth?' asked Mary.

'Wait a minute!' said Tom. 'I don't remember about the eyelids. How do they go to sleep if they can't close their eyes?'

'I don't know, Tom,' said Uncle Jim. 'That's something for you to try to find out when you're older.'

'I'm nearly sure I've asked you all the questions I can think of,' said Mary. 'Perhaps I'll think of some more when we go to the Snake Park.'

The next Saturday, Uncle Jim drove Tom and Mary to the Snake Park. In the middle was an oblong pit about five feet deep. All around the pit was a path and on three of the sides there were many glass cases containing poisonous snakes. Uncle Jim and the children stood looking down into the pit. The walls were very smooth so that the snakes could not climb out. There were plants and rocks for the snakes to shelter under. At first Uncle Jim had to point out the snakes to the children. But they soon learned to watch for the crawling side-to-side movements. And they were lucky enough to see one or two actually swimming in the small pools using almost exactly the same kind of movement.

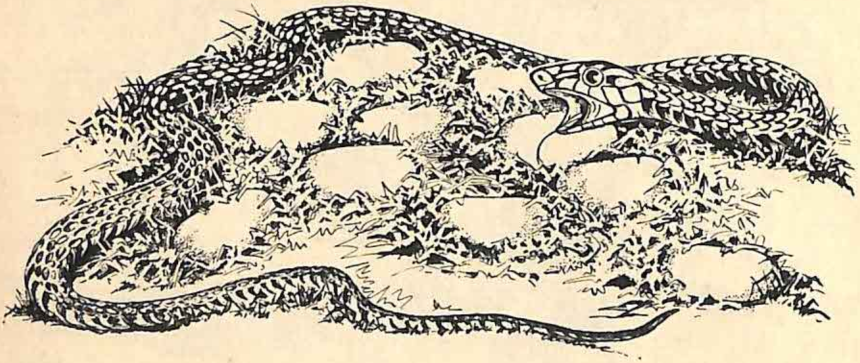
'I've never seen a snake swimming before,' said Mary. 'They look quite graceful in the water, don't they?'

Uncle Jim, who knew the keeper well, introduced the two children to him.

'This is my niece, Mary, Mr Bruce, and this is my nephew, Tom,' he said.

'I'm glad you've come, children,' said the keeper. 'Your uncle told me he was going to bring you and I've got something for you. It's in that hut. I'll go and get it.'

He unlocked the door of the little hut and went inside. When he came back to them he had a little box in his hand. 'Here you are, children,' he said. 'It's a snake's skin. You know that snakes cast off their skin every so often. Have a look at it.'



snake with eggs

'Thank you very much, sir,' said Tom and Mary. They opened the box and took out the snake-skin.

'Why! It's all in one piece!' exclaimed Tom. 'I thought a snake's scales were like a fish's scales—all separate.'

'And the scales underneath are quite different from those on top,' said Mary. 'They're big and wide. They remind me of something, but I can't remember what.'

'I know,' said Tom. 'They're shaped like the marks that a big tractor makes.'

'That's a very good description!' said Mr Bruce. 'I'd never thought of that myself. But don't waste your time examining the skin while you're here. You can do that at home. There's something else I want to show you. Come over to this glass case.'

He led the way over to one of the big glass cases round the pit and pointed to a corner at the back.

'What can you see?' he asked.

'They're eggs!' said Tom.

'I can see ten of them,' said Mary. 'There may be more, but they're not as easy to count as birds' eggs. They don't look so smooth and round.'

'Do all snakes lay eggs?' asked Tom.

'Most of them do,' answered the keeper. 'But some kinds don't.'

'I know what we've forgotten to ask,' said Mary. 'When a snake bites people, how does the poison get into them?'

'I'll have to answer that question quickly,' said the keeper. 'It's nearly time for the Park to close. But next time you come I'll tell you more about it. Have you ever had an injection?'

'Yes, *I* have,' said Mary.

'I don't know what it means,' said Tom.

'Yes, you do, Tom,' said Mary. 'The doctor or the nurse sticks a needle into you with a little pump on the end of it.'

'That's right!' said the keeper. 'Well, when a snake bites somebody, it uses two big teeth in its top jaw. They're called fangs. The poison is kept above these and when the fangs have punctured the skin, the poison goes in.'

'Thank you very much, Mr Bruce,' said Mary. 'And thank you again for the snake-skin.'

'It's time to go now, children,' said Uncle Jim. 'Say good-bye to Mr Bruce and we'll try to come again soon.'

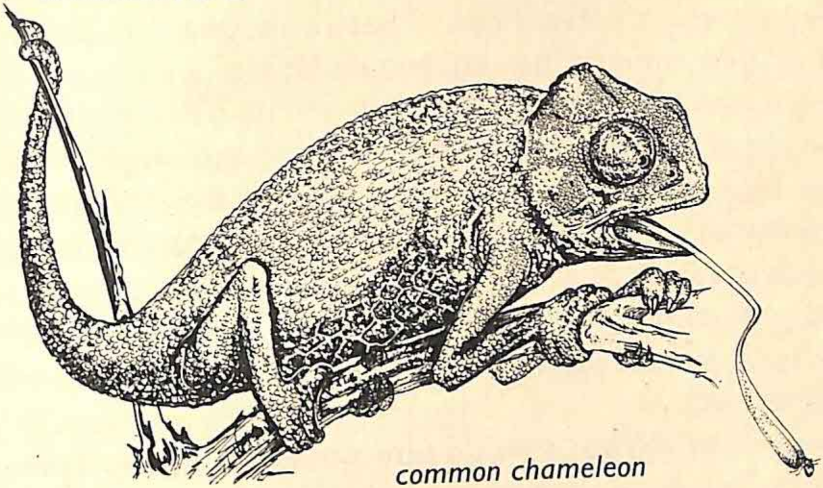
'Oh good!' said Tom. 'Good-bye, Mr Bruce, and thank you very much.'

'Good-bye, Mr Bruce. I hope we'll see you again soon,' said Mary.

'Good-bye, children! Good-bye, Jim!' said the keeper.

Uncle Jim drove them home in his car. As they walked in at the front door he said, 'I've got a question for you two now. How does a snake manage to wriggle out of its own skin?'

LIZARDS



common chameleon

Mary: We've found a chameleon on a bush in the garden, Uncle Jim. Come and look at it, please! We've been watching it change colour.

Tom: Yes, come *now*, please, Uncle! We want to ask you lots of questions about it. I'm sure it'll still be there. It didn't move much and when it did, it was terribly slow.

Uncle Jim: All right, children. Let's go and find it again. A chameleon is a kind of lizard, so we'll be able to talk about lizards and compare them with snakes. I hope you remember all we learned about snakes. Do you?

Tom: I think so, Uncle. Here's the bush. Can you see the chameleon, Mary?

Mary: Not yet, Tom. They're not easy to see unless they move. . . . Yes, I can! There it is, see! I'm pointing to it. Just there! Can you see it, Uncle?

Uncle Jim: Yes, I can now. It's got its tail curled round that forked twig. Did you see its eye moving? Would you like to be able to move your eyes like that? Forwards and backwards as well as up and down and sideways?

Mary: I don't think so. Of course it *might* be useful to be able to look behind with one eye and in front with the other.

Uncle Jim: What else do you notice about its eyes, Mary?

Mary: Well, they stick out, even more than a frog's eyes, but I don't suppose you mean *that*. I know! It can nearly close its eyes. It's got eyelids.

Uncle Jim: Well done! Some lizards can close their eyes *right* up. That's *one* difference between snakes and lizards. Remember?

Tom: Let's see first how they're the same, Uncle. Then you can tell us the differences.

Uncle Jim: All right, Tom. Look carefully and tell me what you can see.

Tom: It's got a head rather like a snake's, but not quite the same. It has a long tail and it has scales. But the scales underneath are small like those on top—not like a snake's bands.

Uncle Jim: You're doing quite well. Now tell me another difference.

Tom: Four legs, of course, Uncle! Snakes don't have legs at all.

Uncle Jim: Yes, that's quite true. Chameleons and many other kinds of lizards do have four legs. But there are some lizards that have only two legs and some that have none at all. So there must be other differences between snakes and lizards, mustn't there? We'll have to go to the Museum again and study the lizards more carefully, won't we?

Mary: Oh! Yes please, Uncle! Do let's go again!

Tom: Oh! Look! Did you see that? The chameleon shot its tongue out and caught a fly. What a long tongue! As long as the chameleon itself, I should think. Isn't that clever!

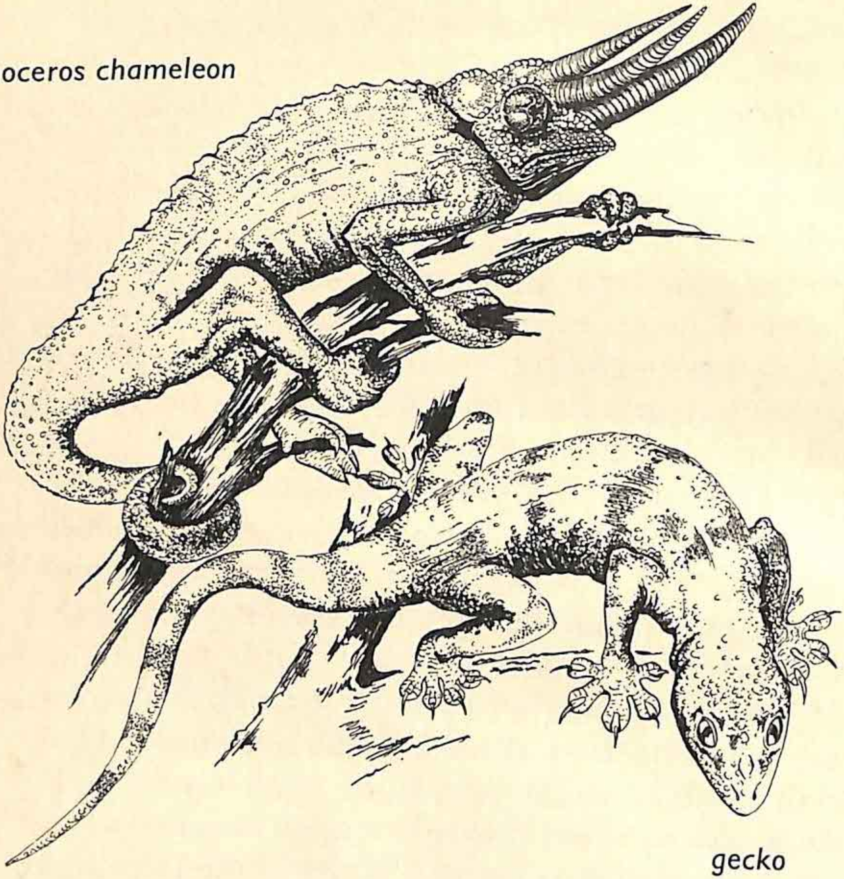
Uncle Jim: Yes, I'm glad you saw it catch something. A very different tongue from a snake's, wasn't it? You wouldn't think a chameleon could catch anything at all when you see how slowly it moves, would you?

Mary: I suppose that's why they can change colour—so that it's hard for their enemies to find them and hard for insects to see them.

Uncle Jim: I suppose so, Mary.

Mary: Is this the only kind of chameleon, Uncle?

Uncle Jim: No, there are several different kinds. One has horns like a rhinoceros. It looks like those



monsters that used to live long ago. I showed you some pictures of them in my Natural History book. But *those* grew to an enormous size. You remember them, I'm sure.

Tom: One more question, Uncle, about this—creature—animal—what do I call it?

Uncle Jim: This reptile, Tom. Lizards belong to the same family as snakes. They are both called reptiles.

Tom: Well, this reptile has specially shaped feet, hasn't it? For clinging on to twigs, I suppose. But I've seen other lizards running along walls in the sunshine and they had very different feet—with quite long claws.

Uncle Jim: Good! You're really beginning to see things, not just to look at them.

Mary: And *I* once saw a small fat lizard with very queer-shaped feet—like five fat fingers all spread out.

Uncle Jim: That was a gecko, I should think, Mary. When we go to the Museum we'll see many different kinds of lizards—some of them very big. Then you'll be able to tell which are which.

Mary: What does the word 'reptile' really mean, Uncle?

Uncle Jim: It means 'crawler', so in a way it's not a very good name, is it? *You* can crawl, but you're not a reptile. But when we use the word 'reptile' in Natural History it means much more. It means an animal that has a backbone, is covered with scales, is cold-blooded, casts its skin and lays eggs—at any rate most of them do.

Mary: My goodness! What a lot for one word to mean, Uncle!

Tom: Are crocodiles reptiles, Uncle? They look very like big lizards.

Uncle Jim: Yes, they do, Tom. I know people *used* to call them reptiles at one time. But I think they've got another special name now. I'm sorry, I've forgotten what it is. We can look it up in the Natural History book.

Tom: Tell us some more about the difference between lizards and snakes, Uncle.

Uncle Jim: Well, a lizard's jaws aren't like a snake's. You remember about snakes being able to open their mouths very wide, don't you? A lizard can't do that, because its jaws are fixed together. So most small lizards live on small creatures like insects. That's why they're useful. And the very big lizards can manage to eat eggs and frogs. And one more difference—lizards have ear-holes and snakes don't.

Mary: What animals live on lizards, Uncle?

Uncle Jim: Birds mostly, I think—especially hawks and kites. We'll have to ask the keeper. But that reminds me. Some lizards can do a very clever trick. They can throw their tails away just as they're going to be caught. So they often escape from their enemies and then they grow a new tail.

Tom: What a clever idea!

Mary: There's just one more question I want to ask you, Uncle. When the mother lizard lays her eggs, does she sit on them and look after them like a bird?

Uncle Jim: No, Mary. Lizards' eggs are usually hatched out by the heat of the sun. Now, Tom! One last question and then you'll have to keep any others for another day.

Tom: Are lizards poisonous like snakes?

Uncle Jim: I don't think there are any poisonous lizards at all in Africa. I know there are some in South America. But let's remember to ask Mr Bruce more about that, shall we?

III

A. Questions

Read through the sections on 'Snakes' and 'Lizards' and answer these questions:

1. Are all snakes dangerous to human beings?
2. Some snakes are useful to man. Why?
3. How is a snake's tongue different from ours?
4. Why can a snake open its mouth so wide?
5. Some snakes swim. Is this true or false?
6. Give two differences between lizards and snakes.
7. Why is it a good thing for a chameleon to be able to change its colour?

8. Describe any lizard you have seen.
9. 'When we use the word "reptile" in Nature Study it means................................' Write as much as you can remember.
10. Does a mother lizard hatch her eggs like a bird?

B. Things you can try to do

1. Examine a snake-skin. Look especially at the different kinds of scales.
2. Find out if a snake has a backbone.
3. Watch a chameleon changing colour against different backgrounds. Can it make itself any colour at all?
4. Look carefully at a chameleon's toes and compare them with a gecko's. If you cannot find a gecko, compare them with any other lizard's toes.
5. Find out what 'cold-blooded' really means.
6. Find out which of these are cold-blooded:
   lizards; hedgehogs; frogs; birds; snakes; fish; mice; tortoises.
7. Would you expect to find lizards in very cold countries (e.g. at the North Pole)? If not, try to give at least one reason for your answer.
8. There is a difference between the way a snake crawls and the way a lizard (with legs) crawls. Can you describe the difference?

C. General Questions

From now on these General Questions and the 'Things you can try to do' are not connected with lessons you have just read. They are intended to make you use your eyes.

1. How are a cat's claws different from a dog's?
2. What is the difference between a cow's hoof and a horse's hoof?
3. Which of these animals have hoofs like a cow's and which have hoofs like a horse's:
   a goat; a donkey; a sheep; a zebra; a pig;
   a giraffe?
4. Do all cows have horns?
5. Are a cow's horns above or below its ears?
6. What happens to a growing plant if you put it in the dark?
7. What is the difference between a slug and a snail?
8. Give the names of six vegetables:
   (a) three of which we eat part of the plant that grows above the ground;
   (b) three of which we eat part of the plant that grows below the ground.
9. About how tall was the tallest maize-plant you have ever seen?
10. Cotton, sisal and pyrethrum are not grown for food. Why are they grown?

PRAYING MANTISES

Mary: What a strange-looking grasshopper I've found, Uncle Jim! Look! It's crawling up my sleeve.

Uncle Jim: That isn't a grasshopper at all, Mary. It's a praying mantis.

Tom: A praying mantis? Why is it called that, Uncle? And what does 'mantis' mean?

Uncle Jim: Look at its two front legs, Tom. It's holding them up like somebody praying.

Mary: But they don't really pray, do they, Uncle Jim?

Uncle Jim: Well, 'mantis' is the Greek word for a 'priest' or 'prophet'. That's how these insects got their name. The Greeks believed that a mantis could see into the future.

Tom: *You* don't believe that, do you, Uncle?

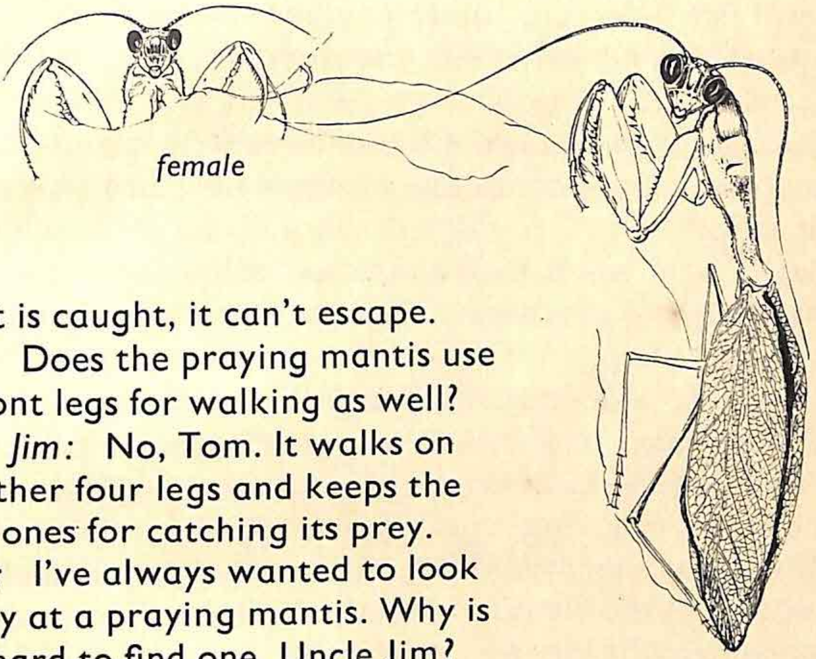
Uncle Jim: No, I don't, Tom! I know what they use those two front legs for—for catching and holding their prey. I've seen them catching insects much bigger than themselves.

Mary: But this one's legs look quite thin. They don't look strong enough to do that.

Uncle Jim: Ah, but look carefully at the inside of the legs. What can you see?

Mary: They . . . Oh! I can see some little spikes!

Uncle Jim: Quite right, Mary. There is a row of small spikes on the inside of each of the front legs. Once an



common praying mantis

insect is caught, it can't escape.
Tom: Does the praying mantis use its front legs for walking as well?
Uncle Jim: No, Tom. It walks on the other four legs and keeps the front ones for catching its prey.
Mary: I've always wanted to look closely at a praying mantis. Why is it so hard to find one, Uncle Jim?
Uncle Jim: Look at it again. Tell me what colour it is.
Tom: It's green. I suppose that helps it to hide in the grass or on leaves.
Uncle Jim: That's right, Tom. But not all of them are green. Some have very odd colours and shapes indeed. In one kind the body looks like a little twig. Others have legs shaped like leaves. And there are others that look like parts of a flower.
Mary: Like parts of a flower? That's clever!

Uncle Jim: Yes. Do you remember, a long time ago, asking me why lions and tigers and leopards are all different?

Tom: Yes, and you said tigers have stripes and leopards have spots and lions don't have either, except the cubs.

Mary: And you told us that their colouring made them hard to see, especially when they were looking for food.

Uncle Jim: We learned a long word that we use in Nature Study, didn't we? We use it when we talk about animals that are hard to see especially when they aren't moving. I gave you a lot of examples of animals and birds and insects that can't easily be seen because of their colour or shape or both. Do you remember the word?

Tom: I know! It's camel . . . camel-something. It means pretending.

Uncle Jim: Nearly right! But it's got nothing to do with camels. It's a French word and we pronounce it in the French way.

Mary: I remember, Uncle Jim! It's camouflage.

Uncle Jim: Well done, Mary. That's the right word. Say it again, Tom. Camouflage.

Tom: Camouflage, camouflage. Now I won't forget it again, Uncle.

Mary: Uncle Jim! You said the praying mantis feeds on insects. What kinds of insects?

Uncle Jim: Any insects it can catch. Mantises seem to be always hungry. They are such fierce killers that somebody called them 'insect tigers'. And they don't eat insects and nothing else. People have seen very large mantises catching large spiders, frogs, lizards and even birds.

Tom: That sounds as though they have huge stomachs as well as huge appetites, Uncle.

Uncle Jim: Well, those *were* the largest kinds of mantises. But an ordinary mantis was watched carefully for one whole day. How much do you think that one insect ate? It was seen to eat three large grasshoppers and one spider. After all that, it was still hungry and tried to eat another mantis.

Mary: Ugh! Do they eat each other?

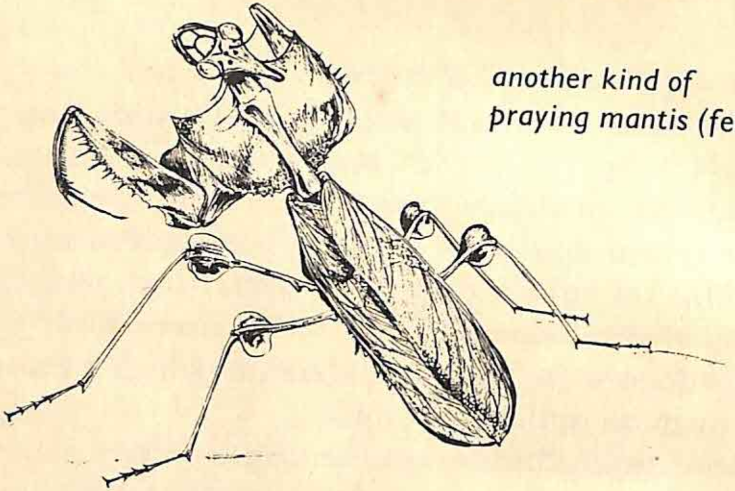
Uncle Jim: Yes, they do sometimes. You remember what I told you about Mrs Spider?

Tom: Yes, you said she sometimes eats Mr Spider.

Uncle Jim: Quite right. In the same way Mrs Mantis eats Mr Mantis.

Tom: If mantises eat so much, they must spend nearly all day hunting for food.

Uncle Jim: So they do, Tom. They stay very, very still and wait. But when another insect comes near enough they move very fast. They must catch it quickly before it can crawl or fly away.



another kind of praying mantis (female)

Mary: Look! This one is sitting very still now. But its head is turning very slowly.

Uncle Jim: Yes, you can hardly see it moving. I think the mantis is the only insect which can turn its head like that. Here's my magnifying glass! Have a close look at its head and tell me what you see.

Mary: I can see two big eyes. They look like the eyes we saw on the butterfly's head.

Uncle Jim: Good! Can you see the 'antennae', the feelers? What can you see between them?

Mary: I can see three small dots. What *are* they, Uncle?

Uncle Jim: They're eyes as well. A mantis has two large eyes and three small ones.

Tom: Uncle Jim! If they have to hunt nearly the whole day long, when do they lay their eggs?

Uncle Jim: At night, Tom. Mantises make a round egg-case, quite a beautiful thing. One day you may see one stuck to a twig. And they do it in the dark when they can't possibly see what they're doing. That's very clever, isn't it?

Tom: Yes, it is. What about the eggs?

Uncle Jim: Well, the mantis lays the eggs at the same time as it makes the egg-case. Each egg is in a little case of its own—a bit like the cells in a bee-hive. And the door of the case can be opened only from inside. Why?

Mary: So that nothing can get in, but the young mantis can get out when it's ready.

Uncle Jim: Quite right, Mary. After the egg is hatched the young mantis wriggles its way out of the case. But it is still wrapped in a skin like the pupa of a butterfly. For a few moments it hangs from the egg-case. Then the skin splits and the mantis comes out.

Mary: Does the baby mantis look like this one?

Uncle Jim: Yes, I suppose so. At first you can't see the wings. Perhaps it looks more like an ant. But it grows more and more like this one all the time.

Tom: Does it change skins as it grows, like a caterpillar?

Uncle Jim: Yes it does, Tom. It changes nine times and each time its wings get bigger. It takes about seven months to grow to its full size.

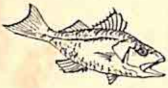
Mary: Are the young ones just as greedy and fierce as the old ones, Uncle?
Uncle Jim: They are indeed. Even the young ones are cannibals—they are quite likely to eat each other.
Mary: I don't like that, Uncle Jim. I think it's cruel.
Uncle Jim: Well, they're not human beings, you know, Mary. They're only insects, and they're very useful. Can you tell me why?
Mary: Because they live on insects. They kill mosquitoes and flies and insects that are harmful to us.
Uncle Jim: Yes, that's the right answer. I think you ought to keep this one and watch it carefully for a few days. You can feed it on flies and grasshoppers and keep it in a tin or a jar. And remember to write your notes well, won't you?

IV

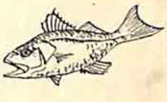
A. Questions

Read the section on 'Praying Mantises' and answer these questions:

1. How does a mantis catch another insect?
2. Does a mantis walk on all of its six legs?
3. What can a mantis do with its head that most other insects cannot do?
4. What is a cannibal?
5. Can a mantis fly?



B. Things you can try to do



1. Make lists of your own of animals that are:
   (a) meat-eaters,
   (b) grass-eaters.
2. Grow beans in glass jars. Put them between a sheet of blotting paper and the side of a jar so you can watch them growing. Make drawings to show how they grow. Put dates on your drawings.
3. Bring a fish to school. Examine it carefully. How many fins has it? Where are they? Are its scales different from a snake's? Has it any teeth? Has it a tongue? Where is the thickest part of its body? Ask about the gills.
4. Ask your teacher to show you how to press leaves. Make a book containing leaves from all the plants in the school garden. Write the names underneath.
5. Make collections of seeds or beetles or (at the coast) shells.
6. Keep a simple weather-chart. Write four things each day:
   (a) heavy rain; a little rain; no rain at all.
   (b) very cloudy; rather cloudy; very little cloud.
   (c) very windy; rather windy; no wind.
   (d) very hot; warm; cool.
7. Watch one particular flowering bush in the school garden. Notice when the flowers begin to appear,

when they are fully open and when they die off.

8. Make a list of birds you see at school or on the way to school. Write down the date when you see them and notice what they are doing, e.g., hunting for food, singing, having a bath, building their nests, feeding their young, etc.

9. (a) Pictures of animals in the Game Parks often appear in the newspapers. Make up a 'Game Park' book.

   (b) Make up another book for domestic animals and birds—cattle; sheep; goats; pigs; hens; ducks; geese; turkeys; pigeons; rabbits; cats and dogs.

10. In the 'Domestic Animals' book do not be satisfied with just collecting pictures. Write notes underneath: e.g. *Sheep*.

    'Sheep provide us with meat (mutton) and wool. They eat grass. They can eat much shorter grass than horses and cows can. A shepherd sometimes has a dog to help him to look after his flock. A sheep's hoof is split like a cow's............................'

C. General Questions

1. Why does a fish in water keep opening and shutting its mouth?
2. Name at least three different parts of a flowering plant.
3. How many teeth have you? Count them with the tip of your tongue. Find out how many a grown-up ought to have.
4. What does the word 'skull' mean?
5. When you plant a bean, does it matter which way up you plant it?
6. Does a bunch of growing bananas hang downwards or grow upwards?
7. Are an elephant's tusks in its lower or upper jaw?
8. Why are a frog's eyes on top of its head?
9. You have a black circle in the middle of the coloured part of your eye. Is the black part in the middle of a cat's eye a circle?
10. Find out what 'chewing the cud' means. Cows chew the cud. Can you name two other animals which do so?

The Peak and New Peak Reading Courses

THE PEAK SERIES has been devised by the Special Centre, Nairobi, under the general direction of Charles O'Hagan, with the assistance of Daphne Penn, Ralph Malone and others. The New Peak Series has been adapted from it by Arnold Curtis.

The Peak Series is designed for Asian children, and the New Peak Course for African children.

This Nature Study Reader is common to both Reading Courses. It is intended for use in the third year of schooling.

OXFORD UNIVERSITY PRESS

Amen House, Warwick Square, London E.C.4.

Church House, Government Road, Nairobi.